MINING AND PETROLEUM STANDARD

AND

AMERICAN GAS-LIGHT JOURNAL.

Devoted to Mining, Petroleum, Gas, Water Supply, and Scientific Subjects Generally.

PUBLISHING OFFICE NO. 22 PINE STREET.

VOLUME IX—No. 24.
WHOLE No. 204

NEW YORK, TUESDAY, JUNE 16, 1868.

$3 PER ANNUM
IN ADVANCE.

The Clipper Lamp Burner.

The world of invention never stands still, any more than the physical planet we inhabit. The age we live in is eminently practical and progressive. History is said to repeat itself, and invention issaid to follow the same law; this gives rise to the aphorism, "there is nothing new under the sun." This may seem to hold true in many instances. Invention especially has pretty well exhausted itself in the department of lamps. Since the antique vessel used by the ancients for a lamp was invented, in which was used vegetable oil (palm oil), which employed the *papyrus*, or the soft fibre of the bark of trees for a wick, to draw the oil to the narrow rim of the vessel, when it gave forth its sickly rays, up to the time (eleven years ago), when the first kerosene lamp was brought to notice, no great stride has been made in improving the general principle upon which they all operated; excepting the discovery and application of the chimney by Argand, Carcel and others, and the French mechanical lamps.

Kerosene and the petroleum oils gave new impetus to inventive talent, in this country especially, which sought to improve and perfect the lamp in general and in detail. The Patent Office shows a record of many hundred improvements since that time, and it would seem the field had been exhausted. Mr. ALFRED BLISS, however, has proved that there is not only something new under the sun, but a rival to it, and that is his new lamp burner. He has taken up the kerosene burner, and made, radically and practically, a new thing of it, and for a wonder has steered clear of the improvements of all his predecessors. No patent hinge, or screw, or spring, tube, deflector, etc., can make him pay tribute; but by a simple arrangement of the parts he has obtained a lamp wherein new results and advantages are obtained, which, we can safely say, seem destined to compete with, and eventually supersede, all the numberless improvements now employed by the public.

The accompanying engraving gives a clear idea of the construction of the "Clipper Burner." It will be observed that the chimney is very short, only 4½ ins. above the base of the cone. The chimney is contracted near the bottom; this contraction rests upon the base of the cone, and the hood or extension below is supported by springs projecting downward, as shown. This is the great feature of the invention. It gives a firm and elastic lateral support to the chimney, and the throat or contraction affords a base support which is always true and even. This is seldom the case where, as in the ordinary chimney, it rests upon the lower edge alone; consequently, it often stands tipping or canted over, giving an uneven draft, and the flame frequently strikes one side of the chimney and breaks the glass. The hood or lower extension of the chimney also serves as a wind-guard to the draft, and it is always cool, whereby the chimney can be removed without burning the hand. Some of the advantages claimed for this burner are, that it will save breaking of chimneys, equal to 60 per cent. in the cost of daily use. It will give a better light for the same oil consumed than any burner now in use; it is always cool, and therefore, there is no danger of explosion; it will adjust itself to different variations of chimneys; it will burn the oil out of the lamp without incrustation of the wick; it can be made cheap, and its price will be as low as any good burner in the market.

It is convenient to carry about, and is free from odor, and is well adapted to use for a night light. With this enumeration of advantages, we are safe to close by saying that two of the largest manufacturers in the country have contracted to manufacture and place this burner in market, and the orders are now far in advance of the supply; therefore it is intended to increase the manufacturing facilities to meet the demand.

For further particulars apply to ALFRED BLISS & Co., 95 Bleecker street, New York.

—Kohn, an engineer in Berlin, gives the following as a method of effectually stopping up a porous cylinder cast for a hydraulic press. The cylinder is to be heated over a charcoal fire to about 170° Fahr. It is then to be filled up with resin and suspended by a crane over the fire until the liquified resin is seen sweating through on the outside. The excess of resin is then poured out and the cylinder allowed to cool, when the pores will be found completely stopped, and no water can possibly pass.

The A.B.C Gas Meter.

The London and Westminster Meter Company (Limited) have patented an invention of undoubted utility, which forms the distinguishing feature of their "A.B.C. Gas Meter." This is an index, which shows the number of cubic feet of gas measured, in the ordinary manner, and at the same time calculates and indicates in plain figures, the money payable for it, according to a standard price. Supposing 5,250 cubic feet of gas are consumed, the money payable at the stated price of 5s. per 1,000 feet is shown to be £1 6s. 3d. As 16 2-3d feet burn the 3d. changes to 4d., and this to 5d., and so on for every 16 2-3rd feet consumed, till the quantity amounts to 5,400 feet, when 7 appears under the heading of shillings, and 0 under that of pence.

According to the company's prospectus, it is intended that the registration of the cubic feet should be continuous, as at present, but that the Cash Index should upon each quarterly taking of the "state of the meter," be put back to zero, and a ticket of the cash, as well as the number of feet to be charged, be left with the consumer. The consumer may, if he pleases, see the meter with the inspector before he unseals it, but if not the account of the cubic feet will enable him to check the demand made upon him, the Cash Index will be secured by the gas company's seal; but should access be obtained to it, either by accident or fraud, the cubic measurement would still remain intact as at present.

By the use of this index, the consumer may see at a glance, from day to day, or hour by hour, the cost of the gas he is consuming, and may consequently regulate it as he pleases. The ticket left by the inspector will at once form the bill for the quarter, by the simple addition of the rent for the meter, and the collector may, therefore, follow the inspector, without waiting for the accounts to be made out at the office. The inspector's book, or at most, a transcript of it, is all he will require.

In case of a change in the price of gas, the index can be changed at a trifling cost. Indices for prices ranging from 3s. 6d. to 7s. 6d. per 1,000 feet are kept in stock, but they can be readily adapted to other prices. —*Ironmonger.*

—M. Caron has published a short account of the way in which he makes his magnesian cylinders for the Drummond light. He takes magnesia which has been purified from alkalies and the other alkaline earths, and after moistening it with a solution of boracic acid, presses it into molds. The reason for separating the other alkaline earths and alkalies is that their presence would affect the color of the light. The boracic acid, we should think, would give a greenish tinge to the flame.—*Mechanics Magazine.*

—When gunpowder is heated nearly up to the point of decomposition previously to ignition, the force of its explosion is greatly increased. It is stated that a temperature of 160° Fahr. increases the force of the explosion one fifth, while a temperature of 400° nearly doubles it.

On Musical and Sensitive Flames.

Abstract of a Lecture delivered, at the invitation of the Council, before the Dublin Royal Society, on January 8, 1868, by W. F. Barrett, Natural Science Master, at the International College, London, Etc.

[From the Chemical News.

One of the earliest natural facts which arrests the attention of a thoughtful mind is the stability of the wonderful universe in which we live. This permanency is, nevertheless, the product of incessant change; for nothing is absolutely at rest. The secret of all the stability of nature, its unresting repose, is found in the fact that the motion is regular—the change is periodic. Atoms, as well as planets, have their period of revolution. Hence, sooner or later, in the physical world at any rate, phenomena repeat themselves. Like a vast living body the throbbings of the universe announce the accord of its varied parts. This rhythmic flow of nature constitutes most literally the "Music of the Spheres." Not this, but a less ethereal music, I have had the honor of being invited to bring before you this afternoon.

The so-called musical or singing flames were discovered nearly a century ago by a native of this city, Dr. Higgins, who found that when a flame of hydrogen was burning within a glass tube the flame emitted a musical note. The experiment was repeated; and it was moreover shown that glass tubes were not necessary, for similar sounds, though of different quality, were produced when metal or pasteboard tubes were employed. Neither was it necessary to use hydrogen, for a small flame of common coal gas gave a musical note when burning within a tube.

The cause of this phenomenon had been investigated by many, but most successfully by an illustrious man who had lately passed from among us—a man who had left behind him a name as good as it was great, and who possessed a mind as simple and child-like as it was sagacious and profound—the late Professor Faraday. This subject had been one of Faraday's early *flames*. The cause was shown to be due to the fact that the gas, in issuing from the burner, did not burn silently. It rustled in passing through the orifice of the burner, and in burning it made a continuous series of inaudible explosions. This was proved by several experiments, for by suitable means both these causes could be exalted so as to become sensible. The resonance of the tube placed over the flame renders audible all the sounds of a certain pitch made by the gas. By a series of experiments it was then proved that any noise, if made regularly and with sufficient rapidity, was converted into a musical note. Thus rough and rude taps and harsh explosions could be chased into perfect melody by mere rapidity of succession.

The condition of the flame when burning within the tube was shown by a moving mirror. It was seen that when the flame was silent, and the mirror moving, a band of light was produced, but when the flame was sounding, this luminous ribbon was broken up into a series of disjointed images of flame. The effect of lengthening the tube in which the flame was burning was next shown, and a series of gas jets burning within glass tubes of varying length gave a corresponding series of musical notes of varying pitch. By placing the finger upon the top of these tubes the sound could be quenched, and thus a novel musical instrument could be constructed. From glass tubes the lecturer passed on to show the effects of flames burning within extremely long tin tubes. Within a tube 6 ft. long, and about 1¼ in. in diameter, the flame of a large gas burner gave a loud unmusical roar. By adding to the end of this tube a glass chimney, it was seen that when the flame was sounding it was broken up into wild confusion. By enclosing a still larger gas flame from a huge Bunsen's burner within a tube 18 ft. long and 3 in. in diameter, a deep roar was obtained, intermingled with loud reports similar to the discharge of musketry.

Returning once more to the gentle music of the small glass tubes, two flames, enclosed in their respective tubes, were taken and made to emit notes of the same pitch. This point was gained by shifting to and fro a paper slider, which moved stiffly at the upper extremity of one of the tubes. When the notes were nearly in unison a series of intermittent sounds or *beats* were obtained, due, as is well known, to the mutual extinction at certain intervals of the two sounds. Corresponding beats were obtained from two organ-pipes and two tuning-forks nearly in unison. One of these tuning-forks, mounted on its resonance case, being silent, the the other, unmounted, was now struck, and its prongs brought near to, but not touching, those of the first fork; at first no sound could be heard, but by degrees the unmounted fork transferred its motion to the mounted one, and the sound of the latter slowly swelled forth. The sound of the voice can thus be transferred to the strings of a pianoforte, and in the same way a flame can be made to accept and resound to a note of the proper pitch. This was illustrated as follows: A singing flame, by adjusting the paper slider, was tuned to the note of a certain fork; the tube was then raised slightly, so that the sound could be quenched by momentarily placing the finger on the top of the tube. On now striking the fork, and holding it over a resonant jar, the flame instantly started into song. The same effect was shown by the syren, and also by the human voice. Retreating to some distance from the flame, the latter could be made to respond at pleasure, by pitching the voice to the proper note, whilst it remained utterly unaffected by any note not in unison with itself. Musicians would find such a flame a faithful monitor in training the voices of their pupils.

In the last experiment we have really a *sensitive* flame; but this name is now applied to another discovery, which was made in the following manner: Two years ago (December, 1865), whilst engaged in some acoustic experiments, the lecturer had observed, that every time a shrill note was produced, a tall tapering gas flame in his vicinity was singularly affected; the flame shrinking every time the note was sounded. That observation led to further experiment and enquiry, the result of which has been the discovery of the conditions of success for obtaining flames sensitive to the slightest sound. Some months after the above observations, Professor Tyndall took up the subject, and having largely added to its interest and importance, offered an explanation of the phenomenon in a lecture delivered at the Royal Institution, in January, 1867. At this lecture the discovery was first published, and the name given to "Sensitive Flames." Subsequently the lecturer had proposed a fuller explanation, and had discovered that not only flames, but all gases could be rendered extremely sensitive to sound, the track of the gas being marked by mixing it with smoke. This historical notice would be unjust without referring to an observation made ten years ago in America, by Prof. Leconte. That physician had noticed that certain sustained sounds in an instrumental concert caused a very susceptible movement of the ordinary gas flames in the room. This observation is really the germ of the more wonderful effects afterwards independently discovered by the lecturer. Though Professor Lecoute was the first to publish the fact, in 1838, it appears that, previous to this date, artisans had frequently noticed the phenomenon as resulting from the shrill sounds of their work; and several musicians have informed the lecturer that the same effect is one they have commonly observed.

Turning now from scientific history to experiment, the lecturer showed various kinds and degrees of sensitive flames. First, a "bat's wing" flame, which, under the ordinary gas pressure, moved slightly at the sound of a whistle, but thrust out long tongues of fire when the pressure was increased by urging the gas from a holder. The increased pressure was always necessary to obtain the more sensitive flames, for a reason that will be understood directly. A jet of gas, issuing from a V-shaped orifice, was shown to be quite insensible to sound until the flame reached a hight of ten or twelve inches, and then, at the sound of certain high notes the flame shortened and spread out into a fan shape.—Whistling to this flame in one key had no effect, while in another the effect was very marked. Playing an air upon a so-called bird-organ, the flame selected the high notes, and promptly shortened at their recurrence.

The probable cause of the sensitiveness of these flames was then alluded to. The impact of air evidently had nothing to do with the phenomenon. This was strikingly shown in the following experiment: By tapping a membrane stretched over the mouth of a large tin funnel, a puff of air could be driven with such force from the narrow extremity that a candle was easily extinguished some twelve feet away. Directing this puff of air against the sensitive flame, it was seen that the flame moved violently, but was utterly unaffected when the puff was driven either to the right or left. This should also be the case if in former experiments it were the impact of the air, and not the sound, that produced the effect. But it was at once seen that when the lecturer whistled, at the same time slowly turning round, the flame still continued to shrink, and was almost as powerfully moved when the back was turned to the flame. The effect, then, is solely produced by the wave-like to and fro motion of the sonorous pulses. As first indicated by Professor Leconte, a gas flame, to be sensitive, has to be brought near its point of roaring; it then stands, according to Dr. Tyndall, as it were on the brink of a precipice, over which the sound pushes it. Agreeing with this explanation, that a sensitive flame is a body in a state of unstable equilibrium, the lecturer supplemented it by comparing the flame to a resonant jar; the flame, as was proved by a moving mirror, being in a state of rapid isochronous vibration when under the influence of external sound. The actual shrinking of the flame was due to an increase in the velocity of the current of gas, which was possibly brought about by an external sound throwing the pipe that conveys the gas into a state of vibration, which would thus narrow the channel of the gas passage; the change in the aspect of the flame being largely modified by the shape of the burner.

Whatever may be the complete explanation of the phenomenon, there can be no doubt that in a somewhat similar manner other objects besides flames are also sensitive to slight external impulses. Thus, many chemical compounds, as, for example, fulminating powders, are in a state of unstable equilibrium. The so called "Rupert's Drop," which, when scratched, flew into a thousand fragments, is another instance of this kind; and some of the most eminent physicists are inclined to believe that the surface of our sun is in a somewhat analogous sensitive condition. From inorganic things we may travel on to organic, for we have evidence that there also exists, in organized structures, a more or less sensitive state at certain times. Thus, our wonderfully complex bodies, by disease or nervous derangement, are thrown into an abnormal state, and when in that condition are sensitive to the slightest stimuli, if of the proper kind. This may possibly be the foundation for whatever truth there is in the science of homeopathy, the body being sensitive to a feeble influence, similar in kind to the disease under which it is suffering.

Here some may ask: "Of what good are these speculations, and to what practical end can these experiments be turned?" This observation, permit me to remark, is wholly improper. There is something nobler in life than the accumulation of wealth, and a higher end to experiment than its mere monetary value; for all accession to knowledge must finally benefit the world. This ever intrusive exclamation, *cui bono*, is a serious check to the advancement of knowledge, for it disheartens those who are making nature yield up her secrets, and it damps the ardor of every searcher after truth. Allow me to illustrate my meaning. Imagine that when enchanted by the performance of some well-executed opera or oratorio, a companion by our side were to say: "Well, after all, of what good are these fine sounds; to what practical end can you turn this music?" Should we not instantly condemn a speech so characteristic of a sordid and sensuous mind? And when the student of nature is listening with admiration and even awe to the sweet, though silent, music sung to him by every object of his diligent study—by air and water, by flowers and flowers—he is conscious that he bows before an oratorio as far above that of Handel as the works of the Creator are superior to the composition of the creature.

Still, however, the lecturer was enabled to show a practical application of these sensitive flames. Attention was drawn to the fact, that the flame shortened and spread out laterally under the influence of a whistle. Advantage was taken of this peculiarity to construct an instrument which may be turned to some practical use. The instrument consists of two sliding brass rods attached at right angles; to the summit of one is a compound metallic ribbon, consisting of thin layers of silver, gold and platinum, welded together. This arrangement expands unequally by heat, by so doing it swerves aside, and is thus brought into contact with a platinum point projecting from the top of the second brass rod, which is fixed about half an inch from the free extremity of the compound metallic ribbon.—Connected with the two brass rods is an electric battery, associated with which is an electric bell, placed in a far distant part of the room. The bell will immediately ring if the electric circle is complete, but at present there is a gap in the circuit between the metallic ribbon and the platinum point. "I now ignite," said the lecturer, "a sensitive flame, which, in its ordinary state, burns at about two inches from the compound metal ribbon. I retreat some thirty feet from the flame and whistle; the flame at once responds; it shrinks and spreads out sideways. By so doing it comes in contact with the metal ribbon; the latter instantly springs aside at the warm touch of the flame, strikes against the platinum point, completes the electric circuit, and there you hear that distant bell answering me every time I whistle." In the same way, at any hour of the night, the crying of a child in its cot would automatically announce itself in its parent's room. By a somewhat similar arrangement, using, however, a different burner, a burglar filing the iron-cased doors of a jeweller's shop could be made to sound an alarm bell; and it is even possible, by making use of the propagation of sound through water, the reflection of that sound through a trumpet immersed in the water, and its conduction to a sensitive flame, shut out by non conductors of sound from the noises on board ship, that an arrangement might be constructed by which the approach of a vessel in a fog might be detected by ringing a bell in the captain's cabin. It is not, however, my province to develop such inventions. With diffidence I throw out these suggestions, which may, I trust, by the practical mind be in some way turned to the public good.*

The lecturer had reserved for the conclusion a flame wonderfully sensitive to the slightest noise. The bur-

* Several of the laws of acoustics may be illustrated to a large audience by means of the sensitive flame next to be described. Placing, for example, a watch in the focus of one concave mirror, and a sensitive flame in the focus of a distant second one, the reflection and convergence of sound is seen by the regular beating of the flame to every tick of the watch. The decay of sound, and the prevention of that decay by tubes, can also be shown in a similar way. Many other illustrations of acoustical phenomena at once suggest themselves. I hope shortly to publish some further applications of this novel *phonoscope*.—W. F. B.

ner which gave this flame was formed of steatite, and consisted of a single circular orifice, through which the gas was forced from a large holder in the lecture room, with greater pressure than could be obtained from the main. The flame was now fully two feet in length, and observe, said the lecturer, how delicate and fragile a thing it appears to be, for at the slightest noise it drops down to a foot.† The jingling of this bunch of keys, the crumpling of this paper, the dropping of a small coin, are more than sufficient utterly to break up its hight and symmetry. This flame makes no responce to the vowels, O, U, nor to the labials, but it energetically responds to the sibilanto. Repeating the stanza—

"Roll on, O rill forever!
Rest not, lest thy wavelets
Sheen as shining silver—
Shrink and sink to darkness!"

The flame is unmoved by the first line, but emphatically bobs at the sound "rest" and "lest," and admirably suits its action to the words of the last line, for, when shrinking, the light of the flame almost disappears. So sensitive is this flame, that even a chirp made at the far end of the room brings it down more than a foot. Like a living being, the flame trembles and cowers down at a hiss—it crouches and shivers as if in agony at the crisping of this metal foil, though the sound is so faint as scarcely to be heard; it dances in tune to the waltz played by this musical box—and, finally, it beats time to the ticking of my watch. How wonderful are all these facts! And the more we know of them the more wonderful do they appear, for this astonishing change in the aspect of the flame is produced by an infinitesimal portion of those almost inaudible sound waves, already enfeebled by their distance from the flame. Looking back on these and innumerable other wonders revealed by physical science, and looking forward on that vast region which remains to be explored, do we not feel ourselves sinking into utter insignificance by contemplating the mysteries by which we are surrounded, while at the same time we are not conscious there is that within us still more wonderful than that without—a consciousness which lifts itself above all phenomenon, grand and mysterious though though they be?

† It is easy to see how a modification of the instrument just described can be, and has been, applied to this flame. The diminution of heat, arising from the falling of the flame can cause the compound ribbon now placed above the flame to recoil upon the other battery connection; or, another arrangement can be employed, an air thermometer having a bent stem, in which are sealed asunder platinum terminals; the circuit being closed by the backward movement of mercury in the tube, owing to the contraction of the air in the bulb.

Lamplighters Superseded.

The Boston *Traveller* has the following: At the Institute of Technology, recently, Professor William B. Rogers presiding, there was exhibited a working model of a new invention for lighting the street gas from a central point by electricity. There are now in Boston 5,000 street gas lamps, and the cost of help to care for them is $49,000. Between the time when the lighting is begun and when it is finished, much gas is unnecessarily used, and it is calculated that the saving from this and other sources by the application of the apparatus will be $50,000 a year.

The practical operation last evening before the Institute of Technology called forth hearty applause. Connected with each gaslight there will be a little box. In the box there will be a valve worked by a notched wheel. Each pulsation of the electric fluid over the wire moves one notch of the wheel, and eighty pulsations turn the wheel half round, and the valve is thus slowly opened; the moment it is open a flash of electricity from a Rhumkoff coil, also concealed in the box, lights the gas. The gas is turned off by setting the electricity at work again on the notched wheel, and with eighty pulsations, in twenty seconds the wheel is turned half round, and the valve closed. It is proposed to divide a city into eight districts. In each district there will be a "circuit breaker," connecting with all the gaslights in that district. At the City Hall there will be a central battery; eight wires will go to the eight circuit breakers; a man at the central office will touch his instrument, and that will flash a current that will move the springs of the eight district circuit breakers; and in twenty seconds more every burner in the city will be lighted.

A Brilliant Invention for Blinding Burglars.—The carrying of weapons has long been forbidden in France to persons in civil life, but a brilliant Parisian invention has lately been made which, while conforming with the law, is a partial aid as a means of defence against burglars and other night robbers. It consists of a *horn* inserted in the end of a cane, which horn contains an electric battery and a small *lamp* with two powerful reflectors. The intensity of this light temporarily *blinds* any person at whom it is pointed. The lamp is kindled at will by pressing a small knob at the other end of the cane, which knob communicates with an electric wire.—*Exchange.*

Treatment of the Condensation Water of Coal Gas.

BY PROF. H. DUSSAUCE, CHEMIST.

[From the American Artisan.]

[Concluded.]

CRYSTALLIZATION AND SUBLIMATION OF THE CHLORHYDRATE OF AMMONIA.

Before exposing the processes used in industry to purify the chlorhydrate of ammonia or sal-ammonia, obtained in the operations we have described, we must say a few words on a method employed sometimes to prepare this compound by a double decomposition between the sulphate of ammonia and the chloride of sodium. Take the waters of the sulphate produced directly, or dissolve the crystalized sulphate in water, so as to obtain a solution marking 20° to Baumé's areometer. This solution is placed in flat vats, additioned with solid chloride of sodium in quantity equivalent to the richness in sulphate. Stir well until the salt is completely dissolved, then let it rest a few hours to obtain a deposit of the insoluble impurities. A double decomposition takes place as indicated in the formula:

$$SO^3\,NH^3\,HO + Ma\,Cl = MH^3\,HCl + MaO\,So^3$$

Sulphate of ammonia. Chloride of sodium. Chlorhydrate of ammonia. Sulphate of soda.

But the two salts stay in dissolution in the liquor, which then is concentrated in flat vats heated by naked fire. Soon as the sulphate of soda has soluble deposits it is taken off and drained. When the concentration is sufficient, run it into crystalizers made of wood lined with lead. They are 6 feet wide, 7½ feet long, and 1½ feet deep.

Whatever has been the method employed to prepare it, sal-ammoniac is far from being pure. It always contains tarry and oily matter which color it, and which are separated by submitting it to sublimation. To practice that operation with success the crystals must be very small; then it is necessary, when the sal-ammoniac is left to crystallize, to stir it so as to obtain it in small crystals easy to dry and sublimate. The apparatus used in the sublimation is a large hemispherical sheet-iron kettle, or a small earthen pot placed on a furnace. Near the furnace, on which are associated several kettles to sublimate, is the oven used to dry the sal ammoniac. It is rectangular, capacity from 6 to 9 feet deep, and 4½ feet wide, placed on a hearth, from which it is separated by a strong cast-iron plate, and the door of which can be closed by a sheet-iron curtain. On the base of that oven introduce a bed about 4 or 5 inches thick of sal-ammoniac; then light a gentle fire, which soon deprives the salt of the water and the free acids it contains. When this result is obtained the gray substance is carried in the apparatus of sublimation. They are formed of hemispherical cast-iron kettles, covered outside with brick, the object of which is to preserve them from the too quick action of the heat. On each one is hermetically adjusted a cast-iron coverall, easy to raise by pulleys. The kettles are heated by a special hearth, the fire of which, very bright in the beginning, is considerably diminished as soon as the temperature is high enough to sublimate. These kettles are from 8 to 9 feet in diameter.

To use this apparatus, introduce into each one a certain quantity of dry crude sal-ammoniac. A kettle of five feet diameter carries about 1,600 lbs. Light the fire in the hearth and keep it bright until the mass begins to disengage some white vapors; descend then the coverall, fasten it with keys, and diminish the fire so as to keep a temperature sufficient for the sublimation, without attaining the degree to which the empyreumatic matters would volatilize. The salt sublimates very slow, and under the pressure of its own vapor forms under the coverall of the kettle a transparent, white, half melted lead, which sometimes is five inches thick. When the operation is done in apparatus of large dimensions, about a week is necessary to have a complete sublimation. Take off the coverall and detach the cake of sal-ammoniac which covers it inside.

The second method consists to operate in earthen pots. It is not much used now. In a furnace are disposed on the vault itself of the hearth two parallel ranks of earthen pots; each one is formed of two parts, the so called pot, provided with an orifice at the upper part, and the dome which covers it. The first is about 1½ feet high, the second eight inches. On the vault of the hearth are pierced, from distance to distance, holes which permit the products of the combustion to penetrate in small quantities above that vault, so as to heat all the outside surface of the pots. To the two-thirds almost of their hight they are encased in a cast-iron plate pierced with slopes which are covered with sand as far as the beginning of the dome. The operation is conducted in the same manner as in the kettles spoken of before. In each pot introduce a convenient quantity of dry crude salt, cover with the dome, and then light the fire. Under the influence of heat the salt volatilizes and condenses on the upper end of the pot, the hole pierced in the middle of that edge permits to the vapors to condense in the dome. When the sublimation is complete, stop the heat and break the pots to extract the transparent sal-ammoniac.

These apparatus are sometimes used to produce directly the sal-ammoniac. For this purpose sulphate of ammonia and chloride of sodium in equivalent proportions are placed into them and heated under the influence of heat. A double decomposition takes place, and the sal-ammoniac volatilizes while the sulphate of soda stays in the pots. Sometimes the product is purposely dirtied by adding in the lower part of the pot a certain proportion of soot. This salt is then gray and sometimes black. This is done to satisfy those who think that the gray salt, similar to that imported from Egypt, is better than the purest white salt.

LIQUID AMMONIA OR VOLATILE ALKALI.

Two methods are now employed to prepare liquid ammonia: that is, the solution of gas ammonia in water, marking 20° to 21° to Baume's areometer. The first and the less complicated is based on the well-known action that quicklime exercises on ammoniacal salts; it is a simple operation of laboratory executed in a larger apparatus. In a kind of cast-iron kettle, of from 25 to 50 gallons capacity, mix rapidly, and adding them by alternate beds, the calculated proportions of sulphate of ammonia and quicklime. On the kettle place an hermetical cast-iron covercle; this covercle carries in the middle a lead pipe which communicates with a vat full of water, and used as a washer; then from there it communicates with a second lead vat entirely closed and filled with distilled water. At the first contact of the lime and the sulphate the reaction begins, the gas disengages, washes in the first vat, and then dissolves in the distilled water. The noise of the gas in the apparatus indicates the march of the operation; when it appears to be slow, light a fire under the kettle and keep it until the operation is achieved. The quantity of sulphate used is calculated in such a manner that the water contained in the second vat is entirely saturated by its decomposition.

The second method consists to purify and condense in a convenient manner—that is, with the least possible quantity of water—the crude ammonia furnished by the distillation of gas-water. The apparatus of M. Mallet answers very well for that purification. It is sufficient to place after the lead vessel a series of similar vessels used as condensators. That modification is so simple that we do not deem it necessary to enter into more detail. The apparatus invented by M. Figuera for the extraction of crude ammonia from the wines is not so good for that kind of operation, and it is by a very different system that that ammonia is transformed in pure alkali. The principle on which rests that system consists to make the gas, before its condensation, run the most possible distance, so as to debarrass it from the water and other condensable substances. This result is obtained in the following manner: The crude carbonate of ammonia, disengaged in a state of vapor, arrives by a lead pipe, the running of which is not less than 150 feet, in a sheet-iron vat nine feet high, and terminated at the lower part by a conical part. The alkaline vapor arriving by the summit of that cone raises a milk-of-lime which has been introduced into the vat by a man-hole. By dabbling to the contact of the milk of lime, the carbonate of ammonia is decomposed, forms an insoluble carbonate of lime and ammoniacal gas, which is disengaged by a lead pipe; dabble in the same manner in a second vat similar to the first, but of less dimensions. The vat contains ordinary water, in which the gas purifies itself: above that vat is a little rectifying column of copper similar to that used for the rectification of alcohol. That column, by its inside arrangements, separates the ammoniacal gas from the greatest part of the water which accompanies it, and falls back after its condensation into the vat, while the gas escapes by a lead pipe and is received in a vat of large dimensions, in which the water left in the gas condenses. That vat measures 15 feet long, and its deepness is about 20 inches, and is full of urine. In that apparatus the gas alone, deprived of its condensation water, is disengaged by a pipe which conducts it to the apparatus in which the dissolution of ammonia is operated.

SESQUI-CARBONATE OF AMMONIA.

The compound designated in the drug trade by the name of "English volatile salt" is white, solid, formed of carbonic acid and ammonia in variable proportions, but its composition is generally $(NH^3, HO)^2, (CO^2)^3$. This salt is obtained by decomposing at a gentle heat the sulphate of ammonia by carbonate of lime. On the contact of these two substances a double decomposition takes place, and gives as result sulphate of lime, which is fixed, and carbonate of ammonia, which disengages in a state of vapor and condenses in convenient apparatus. The reaction is explained by the following formula:

$$3(NH^3, HO, SO_3) + 3(CaO, CO^2) = (NH_3, HO)^2, (CO^2)^3 +$$

Sulphate of ammonia. Carbonate lime. Sesqui-carbonate of ammonia.

$$NH^3 . HO + 3\,SO^3\,CaO$$

Ammonia. Sulphate lime.

The manufacture of this compound on a large scale is done in the following apparatus: In a brick furnace, about nine feet high, are laid down horizontally five or more elliptic cast-iron retorts similar to those used in the manufacture of gas, and closed with plates kept by screws. These retorts are heated by a hearth. From each one departs a lead pipe passing in a lined chamber; other pipes establish the communication between that chamber and a second one. In each retort introduce a mixture of 1½ parts of carbonate of lime and 1 of sulphate of ammonia. Raise slowly the temperature. The double decomposition soon begins, and the carbonate of ammonia, passing by the pipes, condenses in the first chamber, the portions which have escaped to the condensation pass in the second chamber, in which they deposit in a solid state.

Thus prepared, this salt requires a purification, which is executed by slowly sublimating it. For this purpose, dispose on the passage of the gases of the hearth a furnace forming sand bath. The crude salt is introduced in iron pots, covered with lead domes, which are buried in the sand Under the influence of a gentle heat, which must not be over 140° or 150°, the salt soon sublimates, and forms in the domes a fibrous, pure, white mass of sesqui-carbonate of ammonia, which is immediately put in barrels to avoid its decomposition by the air.

Sometimes, as it is practiced by Mr. Laming, near Paris, vertical retorts are substituted for horizontal ones; the other parts of the apparatus are not sensibly modified.

USES OF AMMONIACAL SALTS.

The uses of ammoniacal salts are much multiplied; the chlorhydrate is, since a long time, the indispensable agent for tinning and soldering; calico printers uses it to brighten some colors; the preparation of leathers employs a certain quantity of this salt. The sulphate is the base of the fabrication of alums; the manufacture of artificial manures consumes a large proportion, and everything permits to hope that soon, on account of its low price, this salt will play an important part in agriculture. The caustic ammonia is used in pharmacy and laboratories; dyers employ it to prepare ammoniacal cochineal, archel, etc. It is the same for the sesqui-carbonate of ammonia, or English volatile salt.

The Use of Refuse.

Under the above caption the London *Quarterly Review* publishes a somewhat lengthy but interesting article on the use of refuse in the different manufactures, arts, etc., from which we take the following, which will be interesting to our readers:

Gas-tar and ammoniacal liquor from the gas-works, not many years ago formed one of the most repulsive nuisances known to manufacturers. It was either thrown into the river, where it floated in ghastly blue patches, under the name of Blue Billy; or, as at Edinburgh, was conveyed away stealthily at night, and emptied into the sea. These offensive products have within these last few years been distilled and transferred into a number of liquids and solids, all of which are more or less valuable. The gas-tar, a material with boiling powers unequalled, and with an odor that is unapproachable, yields benzole, an ethereal body of great solvent powers, which forms the principal constituent of "benzine," the most effectual remover of grease stains known, and generally used to renovate kid gloves. Benzole produces with nitric acid, nitro-benzole, a body resembling in odor bitter-almond scent, which is largely employed in perfuming soap. Could any two products appear more antagonistic to the substance from which they spring? From the same tar we have various mixtures of substances chemically similar to benzole. These are popularly known as "naphtha." One liquid of this kind is the gas-substitute of the peripatetic coster-monger and cheap Jack, besides being the source of illumination of many large factories and yards in which night-work is done. Another of them, mixed with turpentine, is at once elevated to the dignity of the drawing room, where it appears in the table lamp as camphene. Naphtha is also frequently used in dissolving resins, india-rubber and gutta-percha. Lamp-black is made by burning, with slight access of air, the least volatile components of gas-tar. Moreover, if these be melted and mixed with pebbles, a valuable paving material is produced, with the appearance of which most of us are familiar. Red dyes, but unfortunately of only ephemeral beauty, can be made from that once dread enemy to the gas manufacturer, naphthaline. The singular thing is that, when distilled at a lower temperature than is required to form gas, oil comes over in which is comparatively much paraffin. It is not, however, from coal, but from certain shales, that the most abundant yield of paraffin is thus obtained. This beautiful, white and crystalline product has been applied to several purposes. When mixed with about two per cent. of stearin, excellent and very cheap candles can be made of it. Melted with a little oil, it furnishes, as Dr. Stenhouse has shown, the best water-proofing agent perhaps, that we possess. It may also be turned to good account as a lubricant for machinery; and lastly, it is an essential ingredient in "paraffin oil," the manufacture of which has acquired, during the last decade, such gigantic proportions. The watery tar-liquor contains ammonia, very extensively used in the arts. If the ammonia procured in coke-making could be saved, as proposed by Dr. Lyon Playfair, it would be a great gain to agriculture, as from the million tons of coke annually made in England at least sixty tons of sulphate of ammonia that is now wasted could be utilized. Mr. Crace Calvert, in his paper read at the Society of Arts, referring to hydrochlorate of ammonia, pointed out that originally the only source from which it was procured was a district in Egypt, where it was obtained in the form of sal ammoniac, by heating in glass vessels the soot which had been produced by the burning of camels' dung. Now, by the aid of science, we can obtain it from a score of sources without going so far for it at charges so costly; and one of these sources is the watery tar-liquor to which we have just alluded, which yields crude sal ammoniac when evaporated with hydrochloric (muriatic) acid. We had forgotten to mention that among the light oils of tar were some which, mixed with the heavy oils, are very effective in preserving wood from rotting, and a very singular product called tar-creosote or carbolic acid, which is one of the most remarkable antiseptics in existence, and is evidently destined to play a great part in the world. In the last visitation of cholera to London, thousands of gallons of carbolic acid were used to disinfect the courts and alleys of the city; and, according to some experiments of Mr. Crookes, the cattle-plague itself promises to succomb to this remarkably agent.

The by-products of gas-works are now so valuable, that factories are actually set up beside them for the purpose of working them up. On Bow Common a company, under the name of the Gas Products Utilizing Company, is thus located beside the Great Central Gas Company. Many of the products mentioned above are made here, beside others, the most important of which is alum. This product, like sal ammoniac, once came at a great cost from Egypt, but is now mainly procured from an aluminous shale, which forms the roof of coal mines, and which has to be brought to the surface before the coal can be gained. This was for a long time a perfect refuse material, covering acres of ground like the spelter and cinder heaps; but chemistry has found it out, and is now converting it into the product which is so valuable to our dyers and calico-printers. This product is made at the works we have mentioned, by setting fire to the shale—the carbon and sulphur it contains being sufficient for that purpose—and treating the friable porous residuum in iron pans with sulphuric acid, to which is added the ammonia from the gas-liquor, and the three bodies combine with water to make common or ammoniacal alum.

When one goes over this remarkable list of materials called forth by the aid of chemistry from the homogenous-looking substance coal, one almost wonders when they will come to an end; from the black material they issue forth like the prisoners rising from the gloomy doorway of the prison-house in "Fidelio," and like them they come forth to enter into new combinations. We may mention that from one of the products of the coal distillation made at this factory at Bow, is prepared the impure murinte of ammonia in crystals, to which we have already referred; and, in order to work up this salt into the "sal ammoniac" of commerce, a chemical firm has built a factory adjoining. Thus three laboratories placed side by side pass on from one to the other products, which, in the passage, suffer transformations quite as remarkable as any that we read of in Arabian story.

GENERATING STEAM BY GAS.—Illuminating gas has been employed in England, in heating steam boilers and generating steam for working the hoisting apparatus of warehouses, or other purposes where steam power is only required at intervals of time. With a vertical tubular boiler of three horse power, steam at sixty pounds pressure is generated by twenty-three burners, consuming 100 feet per horse power per hour in full work. The compactness, economy, and efficiency of the gas heated boilers is highly recommended by those who have used them. The first cost and expense of maintenance is small, and the insurance companies have decided to require no heavy risk premiums on buildings furnished with boilers heated by this plan.—*Exchange.*

GAS IN BUENOS AYRES, S. A.—In an article on "The Use of Refuse," the London *Quarterly Review* says, "the enormous number of horses in Buenos Ayres renders them of little commercial value; but it is certainly odd to hear that the number of mares slaughtered in that country merely for their hides and grease is so great, that it is found economical to light the city of that name with gas made from the fat of these animals."

Fire at the Washington Gas Works.

Last evening, 3d inst., says the *Washington Chronicle*, an alarm was caused by a fire at the gas works in the First Ward. The fire was first discovered in the brick building used as the "governor room," two yards from the gasometer, and within a few minutes a slight explosion occurred. The engines were promptly on the spot, and several streams were thrown on the building. The fierceness of the flames, however, demanded an increased supply of water, and the entire fire department of the city was accordingly called out. Streams of water were continually thrown between the gasometer and the burning building, out of the windows of which rolled great sheets of flame, while from the side of the gasometer the coating of paint already commenced to peel under the influence of the intense heat. It was apprehended for a while that the gas in the gasometer, which was heavily charged at the time, would explode; but by the persistant efforts of the firemen this dread catastrophe was averted. In a short time the flames of the burning building were under control, when suddenly an immense mass of flame shot full fifty feet high in the air between the building and the gasometer, caused by the bursting of a pipe or the disarrangement of a stop-cock. The firemen immediately turned several streams into the cavity from which the flames issued, and finally extinguished them. No further trouble was encountered, and soon not a single spark was to be seen. The fire caused a very limited supply of gas throughout the entire city, and in many places lamps and candles were required to furnish sufficient light.

Lamplighting by Clockwork.

An ingenious apparatus for turning on and off the gas in street or other gas lamps was described by Mr. Stephen Tucker in a paper read at the Society of Arts, on the 13th of May, "On the various methods of lighting streets by gas, with proposals for the introduction of an improved system." The apparatus, said Mr. Tucker, aims at three objects of improvement—to abolish the genus lamplighter, to simultaneously light and extinguish the lamps, and to economize gas.

The Letters Patent (No. 2,435) of Mr. W. Thurger, (who is not professionally connected with gas-engineering, but is a surgeon, at Norwich) sealed the 25th of February last, are for "Improvements in Apparatus for Regulating the Supply of Gas to Burners." The basis of this invention is the American clock. The central spindle of an eight-day clock revolves once an hour, and has two arms inserted to gear with 48 teeth on an independent plate, which therefore makes its revolution in 24 hours. Of these 48 teeth half are inserted on the upper and half on the under surface of the plate, and so have more liberty to bear upon the arms of the spindle. This independent plate has 96 cogs on its circumference, and its retrogression is thus prevented every quarter of an hour by a small spring-stop, to avoid strain on the mainspring. In this 96-cogged plate is inserted a spindle, connected with the outer or dial-plate, which has two arms, one fixed, one movable. This movable or adjusting arm is for regulating the the hour at which the gas should be lighted or put out, according to the time of year. The dial-plate of course revolves also once in twenty-four hours, and at the proper time the arm presses one side of the double cam fixed to the tap in the vertical gas-pipe. On each side of the tap, and connecting, as it were, the perforations, is a small groove, through which, when the light is turned off, sufficient gas escapes to supply a small blue flame, which continues—though invisible through the day-time. The cam being pressed turns the tap, and reduces the light to this blue flame; and on the other arm coming round and in contact with the cam, it lowers the guard, turns on the gas in full, and in effect lights the lamp. The guard (the sole object of which is to protect and hide the small daylight flame) has perforations for air at the bottom, and is connected by a tube with the plate on which the loops of the cam act.

One of these patent apparatus has been tried by Lord John Manner's orders in an outer passage of Somerset House; and another by order of the Master of the Mint, Professor Graham, over the porter's lodge at the Mint. These seem to have required amendment, as they were not strictly regular in the time of illumination. Some obvious objections to the practical and dependable use of the invention in street-lighting were started in the discussion which followed the reading of the paper.—*London Builder.*

—Not more than one or two iron works in the country exceed in magnitude the establishment of the Brady's Bend Iron Company, of Brady's Bend, Armstrong Co., Pa. The manufacture of iron was begun twenty-nine years ago.

California Petroleum.

[WRITTEN FOR THE AMERICAN GAS-LIGHT JOURNAL.]

The telegraph announced on the 11th May that "the trial of California Crude Petroleum as fuel on the steamer Amelia is pronounced a success" We knew that parties in the interest of the Col. Foote patent has been for two or three months past engaged in a series of experiments in San Francisco, with the crude California petroleum as fuel under stationary boilers, and had obtained satisfactory results. An esteemed correspondent, writing under date of April 24, says: "At present our petroleum may be said to possess no commercial value, as it will not pay to refine. It, however, is soon to be tested on one of our inland steamboats—the Amelia—running to Napa, as a fuel for the germination of steam. This trial on the Amelia will soon demonstrate whether it will be of use as a fuel for ocean steamers, and if it succeeds, as we firmly believe it will, California will have an outlet at remunerative prices, for all the petroleum she can produce. The gentlemen above referred to are positive that California petroleum will produce from 20 to 40 per cent. more heat in their mode of burning than the Eastern." The trial here announced as soon to be made has resulted successfully, as appears by the telegraphic announcement already quoted.

The practical value of this demonstration can hardly be overestimated in a market where anthracite coal costs $25 (gold) per ton, Sydney coal $14, and a very inferior native coal $8, and where wood as a fuel for steam is almost unknown out of the mining regions. To show that there is no reason in the nature of things why petroleum should not be successfully used as a fuel, provided the crude article is free from the more volatile naphthas (as the California oil is) and cheap, we give the number of units of heat produced by burning one kilogramme of the following well known substances, viz:

Hydrogen gas	34,462	units of heat.	
Marsh gas	13,063	"	"
Olefiant gas	11,858	"	"
Spermaciti	10,342	"	"
Stearic acid (stearine)	9,710	"	"
Oil of turpentine	10,662	"	"
Gas coke	8,080	"	"
Wood charcoal	8,047	"	"
Native sulphur	2,261	"	"

The heavy California oil, about 20° or 25° Beaumé, will probably fall in about the same rank with marsh gas, giving decidedly more heat than oil of turpentine, and probably 30 per cent. more than gas coke. No danger of explosion can possibly exist in the use of this fuel, and we must regard the success of the experiments on the Amelia as full of promise.

Messrs. Hayward, Coleman & Co., of San Francisco, manufactured a beautiful article of illuminating oil from the crude petroleum, gathered from the tunnels upon their estate in Santa Barbara county, and we learn that from a crude oil of 31° B. drawn from one of their tunnels they manufactured both illuminating and lubricating oils in the following proportions:

38	per cent.	illuminating oil	of	45°	Beaume.
20	" "	"	"	24°	"
23	" "	middlings	"	32°	"
14	" "	residuum			
5	" "	loss			
100					

The lightest oil was completely free from naphtha, and therefore perfectly safe from explosion.

California illuminating oil failed to meet with general favor. Not because it is not a most excellent oil, but chiefly, as we conceive, because the lamps and burners in use are adapted to burning the lighter oils of Pennsylvania, and do not furnish oxygen enough for a perfect combustion of the California oil. We know this is the opinion of the most experienced and responsible parties in California who have had practical experience in its manufacture and sale. The California oil will burn longer with the same volume of flame than Eastern, and produces a higher illumination, but it requires more draft in the burner, and consequently a freer supply of air for its perfect combustion.

The immense decline in value of crude oil, from $10 or $15 per barrel in 1864, to $12 a barrel at present, and even as low as $1.50 in 1867, is alone a sufficient reason why no remote region in an expensive country, with dear fuel and no transportation by rail, can compete with Pennsylvania. The truth is, the production has super-saturated the world's market, producing a glut which is very likely to remain. If, therefore there is an avenue opened for the use of crude California petroleum as a steam fuel, as our present advices lead us to believe, it may be good news to the owners of oil lands in California, whose chief misfortune was that they came upon the market when the tide was rapidly falling. GEO. H. WHEELER.

Correspondence.

The Proposed Convention.

LAFAYETTE, IND., May 27, 1868.

Messrs. Editors: I see that a Convention of gas engineers, superintendents, and others connected with the gas interest is spoken of in your Journal. It will give me pleasure to be a member if it is held in Cincinnati. I believe it will be productive of great good to all. The general interchange of needful information upon all subjects relating to gas making and the management of gas works, will materially assist superintendents and engineers in the performance of their duties.

Very respectfully,
WM. WALLACE, Sup't.

May 25, 1868.

Messrs. Editors: Is it not desirable to have brought before the Convention of gas men at Cincinnati when held the excessive taxation on gas companies? It is laid in all shapes—manufacturing, on gas made, as personal and real in town, county and State; as individual personal property, and finally income tax. Now in the case of a banker, or in almost any other business, if taxation proves too onerous they can wind up with moderate loss and try something else; but what can a gas company do but submit and groan. There is no such thing as taking up the pipes and selling them, and I imagine the gasholder, benches, etc., which cost a great deal of money would bring but a trifle at a forced sale. Under these circumstances excessive taxation on them is very much like a man striking a woman or a child—they can only submit and suffer though death be the consequence—flight or resistance being equally useless. FIAT JUSTITIA.

The following additional subscribers to "Smedberg's Synopsis of British Gas Lighting" have been received, making 177:

George W. Edge, Sup't Gas Co., Jersey City.
Madison Gas Light Co., Indiana.
James Porter, Sup't Greenfield Gas Co., Mass.
Thos. E. Helm, Pres. Jackson Gas Co., Miss.
J. G. Miller, Sup't and Lessee Vincennes Gas Co. Ind.
C. E. Gray, 205 Scoville Ave., Cleveland, Ohio.
James Ravenel, Pres. Charleston Gas Co., S. C.
William Cartwright, Sup't Gas Co., Oswego, N. Y.
Smith & Sayre Man'g Co., 95 Liberty st., N. Y.
James Begga, Sup't San Francisco Gas Co.
David P. Marshall, Insp'r San Francisco Gas Co.
Oakland Gas Co. California.
Petaluma Gas Co., California.
San Jose Gas Co., California.
Vallejo Gas Co., California.
M. Dobozensky, Manufacturer of Meters, San Francisco, Cal.
David Bush, Dealer in Gas Fixtures, San Francisco.
C. O'Conner, State Insp'r of Meters, San Francisco.
Reading Gas Co., Pa.
Gideon Fordham, Le Roy Gas Co., Genessee, N. Y.
George H. Kitchen, N. Y. City.
Charles F. Blodget, Sec. W'msbergh Gas Co., N. Y.

May 28, 1868.

Messrs. Editors: Will you please tell me through your Journal, what is the proper temperature at which the room containing condensing and purifying apparatus should be kept? Last winter we were troubled considerably by tar passing our condensing pipes, and clogging the trays in the purifying boxes, both condenser and purifyers being in the same room. We had no thermometer in the room, but it was kept much of the time at 60° Fah. I should think now, if it were kept down near the freezing point, or if the condensing pipes were kept wet with a small stream of water it would be better. Yours truly, Y. Z.

[Will some of our gas engineers suggest a remedy for this difficulty? We opine the writer gives the remedy in the last clause. If the gas is properly condensed the temperature of the purifying room is of little consequence.—EDS.]

COLUMBUS, OHIO, June 10, 1868.

Messrs. Editors: Inclosed please find $12, which please place to my credit for subscription to your valuable and ever welcome Journal.

Respectfully yours, G. DOUTY.

[We take the liberty to introduce the above, as an evidence of the appreciation in which our Journal is held. To merit and receive approval is one thing. To receive tangible evidence of it is another.—EDS.]

The So-called "Drummond" Light.

According to the *Pall Mall Gazette*, the title of Lieutenant Drummond to the honor of first discovering the light which is now universally associated with his name, is questioned by Dr. William Henderson, of Perth. This gentleman claims the honor for his friend, the late Prof. Anderson, who was appointed Rector of Perth Academy in 1809. "I recollect well," says Dr. Henderson, "that in the winter of 1812–13, Dr. Anderson, when experimenting on artificial lights, showed both of what were afterwards named the 'Bude' and 'Drummond' lights; the first, by passing a stream of oxygen gas up through the interior of an Argand oil-lamp; and the last by a rude modification of the present method. The hydrogen gas for the latter was obtained from the decomposition of water by zinc and sulphuric acid, and the oxygen gas from the black oxyd of manganese, being put into an iron retort and subjecting it to a great heat, by which the gas was driven off and received into a gasometer. Various sorts of limes were experimented with, and the present lime gave the most brilliant light. Dr. Anderson was the most modest and the most unassuming of men, and had he given publicity to these discoveries at the time he made them, both these lights would have been associated with his name. Whether Lieut. Drummond had made the discovery prior to 1812–13 I cannot say, but certainly he did not claim it till long after; and if he had done so, assurededly Dr. Anderson knew nothing of it."—*Artizan.*

Brevities.

—At present there are fifty-eight petroleum refineries in the city of Pittsburg; in active operation.

—Professor Church has extracted from the brilliant red feathers of the bird known as the "plantain-eater" a new animal pigment, which he calls "turacine."

—The shipments of bar and sheet steel made in Pittsburg, during the last three years, were 31,053,507 pounds.

The first lightning rod put up in this country by Dr. Benjamin Franklin is now to be seen on the old house, No. 52 Daniel street, Portsmouth, N. H.

—It has been found that steel rifle-barrels when fired off several times in a northerly direction acquire magnetic properties.

—The noise of cannon has been heard a distance of more than two hundred and fifty miles by applying the ear to the solid earth.

—Arago has demonstrated that the duration of a flash of lightning does not exceed the one-millionth part of a second.

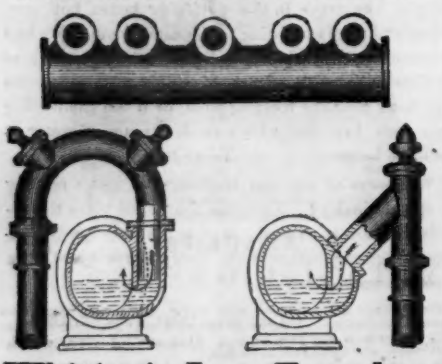
—The daily amount of water raised by evaporation from the sea has been computed to be no less than 164 cubic miles, or about 60,000 cubic miles annually.

—In California the legislature has passed a bill offering a premium of five dollars a tun on the first thousand tuns of pig or blast iron produced in that State from native ore.

—It is rather a humiliating fact that all the mechanical power exerted by a man during his life is more than covered by the power stored up in one small cart-load of coal.

STANLEY'S PATENT

HYDRAULIC GAS MAIN.



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And all kinds of Wrought Iron Work used in the erection of Gas and Coal Oil Works, Wrought Iron Bridges for Railroads and other purposes, Wrought Iron Joists and Girders for Buildings, Bridge Bolts, Jails, and Cells, Etc.

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Cleveland, O., Gas Company.
Davenport, Iowa, Gas Co.
Nashville, Tenn., Gas Co.
Madison, Ind., Gas Company.
R. T. Coverdale, Engr., Cin.
Springfield, Ill., Gas Company.
Baton Rouge, La., Gas Co.
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WANTED—BY A MAN OF THOROUGH PRACtical experience, a situation as Manager or Inspector of large works, or building of small works. Has a thorough knowledge of all branches connected with the above business, as well as gas-fitting. Can produce the highest testimonials from London, Dublin, and Cork as to capabilities and general moral character. All letters shall be promptly attended to by G. B. DUNNE,
204-tf 46 Amity street, New York.

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BAMGS & HORTONNo. 31 Doane street, Boston.

Mines in Harrison County, West Virginia.

Wharves, Locust Point, Company's Office, 29 South street, } Baltimore.

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested. 204-1y

GAS-LIGHT JOURNAL

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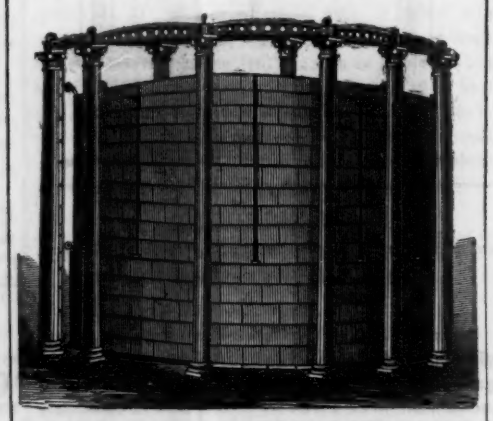

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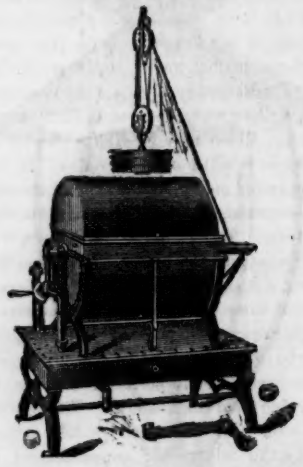

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LAKE FOREST, ILL., Aug. 30, 1867.

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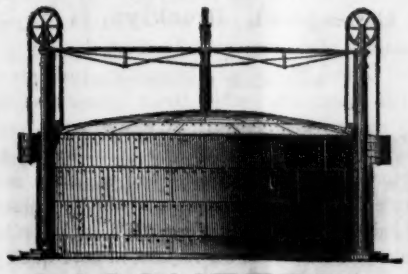

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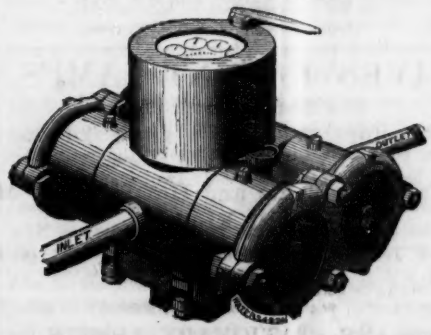

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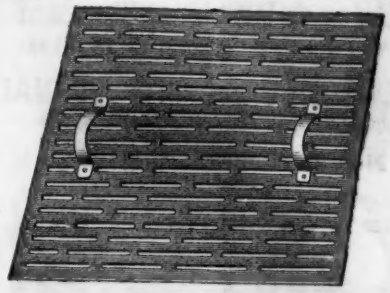

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M. L. CALLENDER & CO.,
EDITORS AND PROPRIETORS.

TUESDAY, JUNE 16, 1868.

WISHING TO MAKE this Journal an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of those subjects a pleasure, or a profession.

SUBSCRIBERS would confer a favor upon us by remitting CHECKS or POST OFFICE MONEY ORDERS, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York, are agents for this Journal. Newsdealers will please send orders to them.

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TO OUR PATRONS.

This number closes the volume of this Journal for this year; the first number of the new volume will issue on the 2d of July, and will mark the tenth year of its publication. There is a degree of satisfaction in our mind greater than we have ever experienced before, in taking a retrospective glance at our past labors in connection with this Journal for the past year. If we can judge by the encomiums of our cotemporaries, patrons and friends, together with the evidences of increased patronage our books show, then have our efforts to make the Journal interesting and valuable been successful;—more so than any other year of its existence. But "Excelsior" is our motto, and we shall not stop here. In the coming year we have arranged to still further improve the general character and enlarge the scope of the Journal beyond any paper of the kind in the world. With this assurance, and with thanks for past patronage we will close, simply reminding, *en passant*, those who intend to subscribe or renew their subscriptions, that the proper and best time is now.

To our advertising patrons we desire to say that our circulation has nearly donbled in the last eighteen months, and we have arranged to place the Journal in the hands of several thousand more, whose special calling naturally require it, when the new volnme commences.

THE CLIPPER LAMP BURNER.

The engraving and description of this truly remarkable burner appears on the first page. Mr. Alfred Bliss, the inventor, has made an improvement in lamps quite beyond anything brought to the notice of the public for the last quarter of a century, at least since the discovery and use of petroleum in this country. The lamps can be seen at A. Bliss & Co.'s, 95 Bleecker street, New York.

DESPARD COAL COMPANY.

Why a country so rich in coals as this should find it necessary to go abroad to find good caking or gas coal, is an enigma to anyone who will take the trouble to think of the supreme folly of the thing.

The United States has a bituminous coal area of 133,132 square miles, while Great Britain has only 8,139 square miles. Now, it would seem very strange if we could not find a coal that is equal or superior even. The genius of our explorers, and the enterprise of our capitalists, would be counted poor indeed if such a magnificent field could not be made to produce what we require, in both quality and quantity.

The Despard Coal Company's mines are located in Harrison county, W. Va., (near the town of Clarksburg), immediately on the Parkersburg branch of the Baltimore and Ohio Railroad, upon the same vein as, and about midway between, the valuable gas coal fields of Westmoreland, Pennsylvania, and Youghioheny of Pennsylvania, and the oil and cannel coal fields of the Kanawha and eastern Kentucky —the peculiarly rich properties of which latter field are said to be closely approached by Despard coal in some of its characteristics.

The coal is prepared with great care, and sent to market in superior condition. It carbonizes easily, and yields a large quantity of very superior gas. The coke is good, free from ash, and gives a high heat. It is excellent for locomotives, glass works, and fire brick fuel, and is largely used for these purposes, and is a superior house coal.

For gas purposes it is very superior, taking the place of English cannel to mix with Provincial and other poor coals, to give richness to the gas. This coal has been introduced only two years, and has, in this short time, become very popular. The Manhattan and Metropolitan gas companies, of New York, Jersey City gas company, N. J., and the Washington, D. C., gas company employ it, and many others; all, we understand, with great satisfaction. Gen. Charles Roome, president of the Manhattan gas company, says "it is a first-class coal, producing a gas equal in illuminating power to any caking coal we have ever used."

"Confined to a production of 9,500 cubic feet per ton, which is the quantity for comparative tests, the gas has an illuminating power equal to 20.41 standard candles. It yields 36 bushels of coke per ton, weighing 1,541 lbs. The coke is good, and makes a clear, strong fire. The analysis is as follows:"

Volatile matter.....	40.00
Fixed carbon.....	53.3
Ash.....	6.7
	100.0

We are gratified to know a coal so much needed is in market, and congratulate Messrs. Parmelee Brothers in being the agents for this city. Their office is at 32 Pine street, N. Y. See advertisement elsewhere.

CALIFORNIA PETROLEUM.

In another column will be found an interesting article regarding petroleum on the Pacific Coast. The writer of the article has passed two years in the California Oil Regions, at San Buenaventura, Santa Barbara county, 350 miles south of San Francisco. There he organized the well-known Haywood Petroleum Company. In the development of this district, Mr. Wheeler, (who is now in this city), conceived and put into practice the idea of "tunneling" in order to reach and explore the different seams and veins of oil, in place of artesian wells. It is then conducted into a common receptacle where it is pumped out as usual.

It is estimated that over 1,000 barrels of surface oil run to waste per month at this place. This oil has a specific gravity of 30° Baume.

Mr. Wheeler states that oil is found at Los Angelos, 100 miles south of this point, and even in Mexico. It is also found north of San Francisco at Humboldt, and at as high a latitude as Oregon! Most of the oil of this coast is of a low gravity of about 30°. At Santa Clara, oil was found at a depth of 250 feet, and pumped several barrels per day. This oil had a gravity of 45°, and yields from 80 to 90 per cent. of refined oil. Humboldt oil stands at about 45°, and is said to be equal to any of the Pennsylvania oils for refining oils. In Calusa county, Sacramento Valley, is found a light surface oil, mostly of a white color as it issues from the earth.

From San Buenaventura north along the coast range, a distance of over 40 miles, the whole country exhibits oil in the lateral runs and ravines. Farther east, beyond the eastern slope of the San Joaquin Valley, it is said petroleum is found in great abundance, but too far from market to be valuable at present.

The property of the Philadelphia Co., known as the "Pica Spring," in Los Angelos county, is somewhat historical, as being the first developed oil property in California. The oil comes out of the base of a hill, whence it has flown for years. This oil is peculiar, owing to its beautiful green color The gravity of this oil is 26°. This is the property which Professor Silliman first made a scientific examination of and report, and it is now admitted by those best able to judge, that his theory and report of this new element of wealth, instead of being visionary, was far below the reality, as later developments have fully proven.

LARGE GAS WORKS.

We lately had the pleasure of a call by Mr. A. F. Havens, the accomplished engineer and superintendent of the Brooklyn Gas Light Co., who has been absent travelling on the Continent for several months. Mr. Havens has returned with improved health, that being one of the objects of his tour; and we presume also, with a large additional fund of professional as well as general information. While in Italy he had the satisfaction of seeing the largest gas works in the worldin full operation, and took a close observation of the "process" as practiced by *Nature*. Mr. Havens gives a glowing and graphic description of the process of "drawing a charge." The carelessness in which the red hot coke and cinders are thrown around is truly awful, and sometimes disastrous to the quiet and equanimity of too inquisitive visitors, as he had a striking example of.

The "process" of making gas is quite original, and different from White's "Water Gas," or Lowe's "tar process," and is not laid down in Clegg at all. Neither does it resemble any of the late improved methods of gas making, such as Levi Stevens' famous "Petroleum process," as experimented with at at Washington, or Green's "sawdust" plan, which seems to flourish best in its native State where the material is plenty and cheap. It is not similar even to the new oxygen process from Paris, which the *Herald* in its usual happy scientific style of elucidation, says is produced by the action of steam on "*manganesotes*," and to make the term more plain to tyros in gas chemistry, describes it as "compounds of manganoric acid with bases." The multitudinous air-gas improvements, including the popular "Pneumatic Gas" of Rand, are quite dissimilar to this Italian process. It only resembles the truly scientific and economical "Hydro-carbon process" of Harris-Gwynne, inasmuch as it does superheat and decompose steam, to manifest advantage.

The gases evolved by this stupendous gas works first mentioned, is said to be of a *high* candle power,

but very deficient in purification; evidently not having the advantage of encountering either hydrate of lime or the newly invented "Prepared Iron Ore" of Messrs. St. John and Cartwright.

A peculiarity of the process is the long intervals between the charges or discharges, and the poor quality and great quantity of coke made. The theory of clay retorts and high heats is carried out in practice fully there; and the preference seems to be also for large retorts and few in a bench. The plan, however, of illuminating the city of Naples and surrounding country with so few burners, and at so great an elevation is not good, and the waste of gas by leakage is certainly more than the usual percentage.

We shall hope to give our readers some "items" of information on gas matters in the Old World, through the favor of Mr. Havens now he is home, and likely to have more leisure, we hope, and that will make amends for the promised letters we did'nt get during his absence.

SMALL GAS WORKS.

There never has been a time when the demand for small gas works was so apparent as now. This is especially the case in the Western and Southern States, where towns spring up and become incipient cities, almost before the residents themselves are aware of the fact. The greater convenience and advantage of legitimate gas in point of economy, and its greater safety compared with other artificial illuminators, such as lamps, candles, etc., are facts which intelligent people are beginning to learn.

Besides, as population increases social life develops, and the elegance, luxuries and refinements enjoyed in the cities are quickly imitated by their town and country cousins, who, by the way, enjoy these advantages the more, the more remote they appear to be. The numberless accidents by using petroleum lamps, owing to the difficulty of buying a safe oil in market, seems to call for a safer plan of illumination on a small scale. If petroleum is distilled into gas it is no matter what its gravity is, or whether it is crude or refined. When once it is gas it is safe, and then we have all the advantages so desirable in artificial illumination. Invention, if it has not, will produce fixed gas by distillation so cheap that almost every one can have it, whether residing in town or country.

We subjoin a list, taken at random, of some of our small Western and other towns having gas, and the prices paid. The average price of gas is over $4.75 per 1000 cubic feet. Generally, they use coal to make gas; but if petroleum-gas is cheaper when it is so plenty, why not employ it in the special apparatus adapted for it? as instance Deav's patent, described in No. 199 of this Journal. In this way the prices below may be wonderfully reduced to approximate to city prices.

Washington	Gas-Light	Co.,	N. C.	$6.00
Columbia	"	"	Pa.	4.00
Rock Island	"	"	Ill.	4.50
Gallon	"	"	Ohio	5.00
Madison	"	"	Ind.	4.75
Hamilton	"	"	Ohio	5.00
Coldwater	"	"	Mich.	4.56
Portsmouth	"	"	Ohio	4.00
Belleville	"	"	Ohio	4.50
Marietta	"	"	Ohio	4.00
Grand Rapids	"	"	Mich.	4.00
Marion	"	"	Ohio	4.00
Wooster	"	"	Ohio	4.00
Galena	"	"	Ill.	5.00
Xenia	"	"	Ohio	4.00
Petersburg	"	"	Va.	5.00
Waterford	"	"	N. Y.	7.20
Portland	"	"	Me.	6.00
Bloomington	"	"	Ill.	5.00
Hudson	"	"	N. Y.	5.00

LONG'S HOT BLAST OVEN.

Mr. Richard Long, of Agatha, Jackson county, Ohio, has invented and patented a hot blast oven, for heating air in smelting ores, etc., which seems to have great merit.

Heretofore, the apparatus for this purpose has been made of iron, and consequently was soon destroyed by the excessive heat, so that the expense of renewing the heating pipes and chambers detracted much from the value of the improvement. Mr. Long has an ingenious arrangement of clay tubes or pipes placed horizontally in the oven or waste heat chamber of the furnace. These tubes are placed so the air enters at the top and passes to and fro across the chamber many times, before it reaches the bottom to pass into the furnace. It thus becomes more and more heated, until the temperature may be sufficient to melt iron before it enters the blast, if necessary, without injuring the pipes. There are other points of merit in this invention, which we will speak of again, when the apparatus will be illustrated with an engraving.

NEW AIR LIGHT.

People must have light, and are willing to pay for it. It is not enough that the denizens of large cities and towns can have the convenience and luxury of gaslight; residents of towns and even country people are determined to compete with their city cousins in elegance, refinement and conveniences of life; socially, too, they are not to be outdone. Hence it is, artificial light is so earnestly demanded, and that a good air-light or gas machine is sure to meet with a rapid sale, and the patentees and manfacturers reap a rich reward.

In this connection we wish to mention that a late improvement of this nature called the "Sangester Gas Machine," is on exhibition at 134 Bleecker st., in this city, which those who are in "search of light" should go and see. Its simplicity and cheapness are the special advantages claimed for it. Mr. Daniel H. Burtis is the gentlemanly proprietor, of whom further information may be obtained.

NEW ADVERTISEMENTS.

Messrs. George Stacey & Co., Cincinnati, Ohio, introduce an advertisement to the effect that they manufacture gasometers, wrought iron roofs and all kinds of wrought iron work for gas and coal oil works, bridges, buildings, etc.

This is another evidence of the enterprise which animates the Great West, and shows also, that where there is a demand there will be a supply, whether it is for pins and needles, or a structure where strength and architectural beauty combine to command admiration.

Stanley's Hydraulic Main.—Mr. L. P. Whiting, of Whiting's Iron Foundry, Kemble street, Boston, Mass., has secured the right to manufacture and supply this improved main. This main is becoming quite popular, and is much lauded by those who have tried it, we understand.

T. F. Rowland, Continental Works, Greenpoint, N. Y., introduces with his advertisement an excellent miniature engraving representing the large gas holder lately erected by him for the Brooklyn Gas Works. Mr. Rowland, now that "Monitors" are out of fashion, has commenced manufacturing gas works on a large scale.

Country Residences.—A. J. Bleecker, Son & Co., 77 Cedar street, will sell, at 12½ o'clock, June 18th, 400 plats for country seats at Rutherfurd Park, on the beautiful Passaic river, N. J., 45 minutes by the Erie Railroad from the City Hall. It is offered by the Rutherfurd Park Association, an unconditional sale, 10 per cent. down, 20 per cent. in thirty days, when deed is given, 70 per cent. to remain on bond and mortgage three years. Trains leave foot of Chambers street on day of sale at 11 o'clock; also, 6:45, 9:15, 10, 12, 1:45, 4, 5, and 6:45. This is a splendid chance. Try it.

NEW BOOKS.

"Roscoe's Elementary Chemistry," by Henry E. Roscoe, B.A. F.R.S., Professor of Chemistry in Owen's College, Manchester. New York: Wm. Wood & Co., 61 Walker street.

This is a neat volume embodying the most important facts and principles of modern chemistry, in a plain but precise and scientific form, particularly suited to the present requirements of elementary instruction. It has added a series of exercises and questions upon lessons, which is especially valuable to beginners to assist them to fix in the mind the rudimentary principles laid down. The metric system of weights and measures, and the centigrade thermometric scale are used, which is quite appropriate just at this time. The descriptive engravings are numerous and neatly done, the context clear, and the binding is in good style and durable. We consider it just the work needed at this time, and have no doubt our primary schools will adopt it with great satisfaction. Price, $1.50.

Five Hundred and Seven Mechanical Movements.—This is the title of a neat little work compiled and edited by Mr. Henry T. Brown, of the *American Artisan* whose well-known ability and large experience is sufficient guarantee of the excellence of the work. The engravings are clear and well executed, and the descriptions are concise and lucid. In binding and typographical execution it is complete. The work embraces all the movements which are important in dynamics, hydraulics, hydrostatics, pneumatics, steam engines, mill and other gearing, presses, horology, and miscellaneous machinery, including many movements never before published, several of which have only recently come into use. This work meets the want which has long been seriously felt by artisans, inventors and students of the mechanic arts. In fine, it is just the right thing in just the right time, and from the right place, and no mechanic or artisan in the country should be without it.

Messrs. Brown, Coombs & Co., No. 189 Broadway, are the publishers. Price, $1.00.

ERRATA.

In our issue of the 2d inst. in Answers to Correspondents—H. H. W., of Ind, 12th line commencing "is to turn on *a sheet* of gas, etc." read, "is to turn on *or shut* off gas, etc."

In the editorial on Oxy-hydrogen Light, 3rd column, paragraph commencing "Practical Value," 31st line, "Hence will be understood why, *temporary*, etc." dele the word temporary and insert it before the word "snow-blindness" in the last line.

☞ Answers to Correspondents are unavoidably laid over for our next issue.

Chemical Action of Light.—Professor Roscoe, of Manchester, exhibits the different degrees in which red and blue media transmit the chemical rays, in the following manner: He fills a thin glass bulb with a mixture of hydrogen and chlorine gases, produced by the decomposition of hydro-chloric acid by means of the voltaic current; and the room being darkened, places this bulb in a lantern having one side of red, and another of blue glass. A flash of light rich in chemical rays, is produced in front of the lantern by igniting a mixture of nitric oxide and bisulphide of carbon. If this light is received only upon the red glass—the bulb being covered—no effect is produced upon the bulb within—the glass *absorbing* the chemical rays; but if the red side is covered, allowing the blue glass to *transmit* the rays, there is a sudden union of the gases in the bulb, and an explosion is the result.—*Sci. Press.*

☞ *For New Advertisements see page* 373.

Saving in Leakage, Saving in Labor, Saving in Lead.

THE MOST PERFECT CONNECTION FOR STREET MAINS.

ROBBINS' PATENT JOINT.

MANUFACTURED BY

GREAT WESTERN PIPE FOUNDRY,

Newport, Ky.,—T. G. Gaylord & Co., Proprietors, Cincinnati, O.

WEST JERSEY FOUNDRY,

Camden Rolling Mill Co., Proprietors.—Jno. W. Middleton, Agent, Phila., Pa.

EXTRACTS FROM TESTIMONIALS.

These pipes can be laid with much greater facility than the common joint, are tighter when laid, and more secure against any disturbance of the joint by action of time or other causes.

In my judgement, the Robbins Joint is superior to any mode yet presented for connecting gas mains. H. J. MILLER, Cincinnati Gas Company.

After using it extensively, and testing it thoroughly, I am fully persuaded that, as a connection for street mains, the "Robbins Joint" has no equal.

Its superiority consists of facility in laying, economy in time and lead, and, above all, its perfection as a Joint, thus saving largely in leakage. H. STACEY, Superintendent Indianapolis Gas Co.

We are entirely satisfied with the "Robbins' Patent Joint" for connecting our street mains. R. SALTER, Superintendent, Covington Gas Company.

All the pipe laid have been tested by hydraulic pressure, and carefully put down, mostly, with the Robbins Patent Joint.

Experiment has fully demonstrated that said joint is entirely reliable, infinitely superior, and more economical than any other we have seen.—Annual Report of Sup't Cincinnati Water Works.

The experiment of laying the first lot of patent pipe has been concluded to my satisfaction. Your pipe layer laid 1200 feet in ten hours, notwithstanding numerous obstructions, such as rain, mud and water in the trenches, curves and crossings at intersections. E. W. BAILEY, Sup't Evansville Gas Company.

The quantity of Gas saved by using Robbins' Joint for street mains is of the utmost importance to gas companies. R. T. COVERDALE, Gas Engineer.

As there is always a large difference between the quantity of gas made at the works, and the quantity for which the Company receives pay, any improvement that will reduce that loss must be very important to owners of Gas Works. We claim this desideratum for the "ROBBINS' JOINT."

The Manufacturers will contract with Water and Gas Companies to lay the Pipe in the trench, even under water, and guarantee the Joint to be absolutely tight.

BIRD, PERKINS & JOB,

IMPORTERS OF

COAL FOR GAS, STEAM AND IRON

MANUFACTURES.

Agents for the sale of the **Westmoreland** Coal Company's celebrated

GAS COAL,

and the Consolidation Coal Company's "Ocean Mine"

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Particular attention given to the charter of vessels at the lowest freights.

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GEO. H. BRONSON,

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Dealer in

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From PURE CANNEL COAL, adapted to all classes of

Stationary Machinery,	Woolen Factories,
Locomotive Engines,	Cotton Spindles,
Railroad Cars,	Sewing Machines, &c.

Paraffine Wax and Paraffine Wax Candles. Also the best brands of Burning Oils. All Oils guaranteed to answer the purpose for which they are recommended.

57 60

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CINCINNATI, OHIO.

Wholesale Dealers in

Gas Fixtures, Gas & Steam Fittings,

WROUGHT & CAST-IRON PIPE,

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Wet and Dry Gas Meters.

Also a Full Assortment of

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GAS COMPANIES and dealers supplied with anything in the Gas, Steam or Plumbing lines at the lowest trade rates.

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Opposite John Street. 62-85

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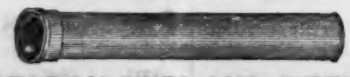
MANUFACTURER OF



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GAS AND WATER MAINS.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths.

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BALTIMORE MD. [184

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Manufacturers of Fire and Water-proof

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ROOFING TOOLS, &C.

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DEALER IN ALL KINDS OF

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Vulcanized Machine Belting,

Conducting, Hydrant, and Engine Hose,

GUM STEAM PACKING,

Amidon's Improved Clothes Wringer,

And all kinds of Useful and Fancy Rubber and Vulcanite Goods,

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Middle of the Block between Fulton and Dey Streets, NEW YORK.

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Succesor to Sawyer & Co.,

SOLE MANUFACTURERS OF

Carr's Patent Water Closets,

URINAL VALVES, &c.

Also Manufacturers and Dealers in PLUMBING MATERIALS OF EVERY DESCRIPTION, Plumbers' Brass Works, Earthen Ware, Pumps, Iron Drain Pipes, Traps and Sinks, Copper Bath Tubs, Showers, &c., &c.

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149, 151, 153, 155, 157 Centre Street, cor. Canal,

NEW YORK.

Illustrated Catalogue and Price List sent on application.

☞ 152-176

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HOY, KENNEDY & CO.,

Engineers and Contractors

FOR THE ERECTION OF

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Extensions, and Improvements, are prepared to supply

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With all the materials used by them. [77-t

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IRON AND OTHER METALS.

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Manufacturers of WROUGHT IRON PIPES and Fittings for Steam, Gas and Water, Boiler Flues, Steam Boilers, Coils, Heaters, Evaporators, Pumps, Ventilating Machinery, and Apparatus for Warming Buildings by Steam and Hot Water.

OIL TUBING, CAST IRON DRIVING PIPE,

Boring Tools, Oil Pumps, Sand Pumps, Stuffing Boxes, Tongs, Clamps, Swivels, Joints, &c. 131

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ANALYTICAL CHEMIST,

Metallurgist & Mining Engineer.

☞ GOLD AND SILVER BOUGHT.

240 PEARL ST. Cor. BURLING SLIP, N. Y.

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AND OTHER SECURITIES,

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(SUCCESSORS TO P. CASSIDY,)

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IRON, COPPER, BRASS,

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☞ N. B.—The highest cash price paid for the above named articles.

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DEALER IN

GASOLEINE.

SUITABLE FOR GAS MACHINES, ALSO FOR CARBURETTING OF GAS, &c.

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The Cameron Coal Co.,

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The Company are prepared to fill orders at the lowest possible prices for their Coal, which BY ACTUAL TESTS PROVES TO BE EQUAL TO ANY OTHER BITUMINOUS COAL MINED FOR GAS PURPOSES, and is equal to any in use for Locomotives and steam purposes generally.

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Fire Brick & Enamelled Clay Retort Works,

MAURER & WEBER,

(Of the late firm of B. Kreischer & Co.)

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Office & Works in 15th street, Avenue C,

MANUFACTURERS OF

Fire Brick and Tiles,

OF ALL SHAPES & SIZES,

Fire Mortar, Clay and Sand.

☞Articles of every description made to order, at short notice. (135

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☞ *Established in* 1345. ☜

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GAS RETORTS, TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND.

Articles of every description made to order at the shortest notice.

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MANUFACTURERS OF

Gas Retorts, Tiles and Fire Bricks,

Black Lead Crucibles, and Carburet of Iron Stove Polish,

JERSEY CITY, N. J.

Refer to—Manhattan Gas Light Co., New York. [135

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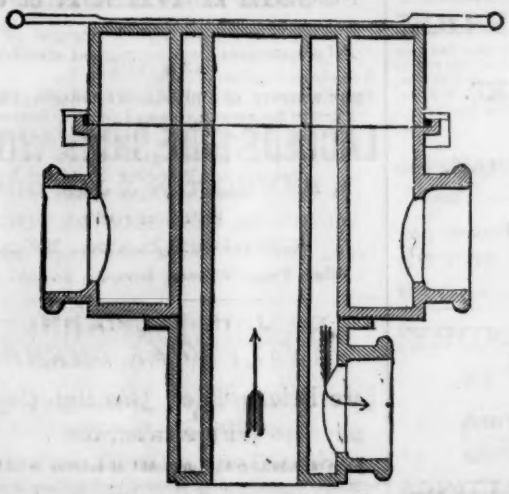
JOHN NEWKUMET,

Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay Retorts and Dentist Muffles. Orders filled at short notice.

PATENT DRY CENTRE VALVE.



The **American Meter Company** invite the attention of Gas Engineers and Gas Light Companies to the PATENT DRY CENTRE VALVE, which is very superior to the HYDRAULIC CENTRE VALVE, and much more durable, besides being less expensive, and not likely to leak or get out of order. It has been successfully introduced at the following Gas Works, where reference may be had of its satisfactory performance:

Detroit, Mich.....	16 inch.	Louisville, Ky.....	6 inch.
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Having the Patterns complete for each size, from four inches to sixteen inches, we are prepared to furnish them at short notice.

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AN INDESTRUCTIBLE COATING FOR

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It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though said at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

For patching boilers and making joints, it is considered superior to red lead, or any other preparation.

For cleaning metals it takes the place of crocus, ouge, and emery, being better and cheaper.

This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral aints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Five Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

Also, Prince's Imperial Black Paint, and Prince's Protoxide of Iron.

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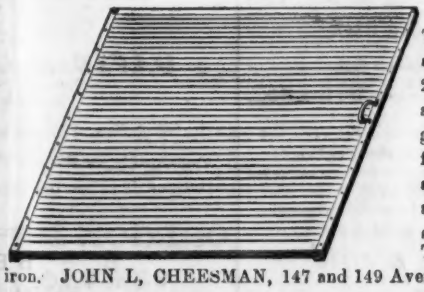

☞ The advantages of these Trays over those made of iron, are economy (they being over 200 per cent cheaper than iron, and will last twice as long), a greatly increased purifying surface, and a saving of time and and labor in removing the lime, as it does not adhere to the smooth surface of the Wood Trays, as is the case with the iron. JOHN L. CHEESMAN, 147 and 149 Avenue C, New York.

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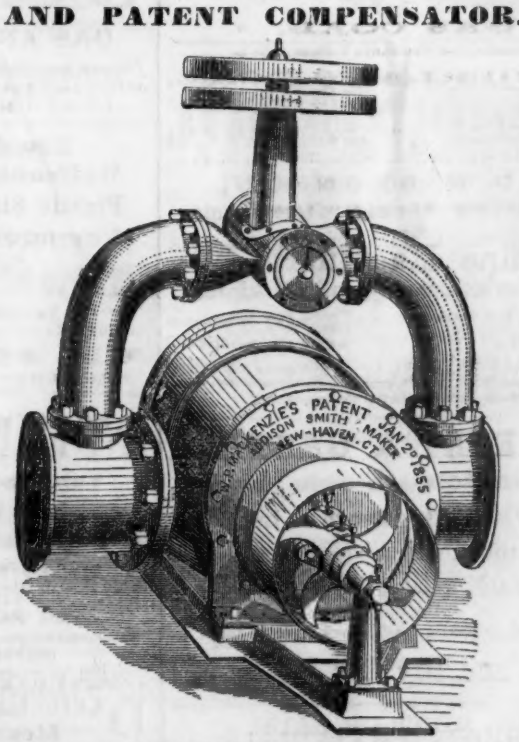
The Mackenzie Patent Gas Exhauster,

AND PATENT COMPENSATOR.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 ton to 20 ons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent. fuel. Address

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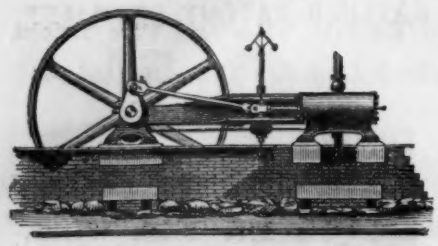

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Flue and Tubular Steam Boilers, Tanks, Oil Stills, Mill Work, Machinery, etc., etc.

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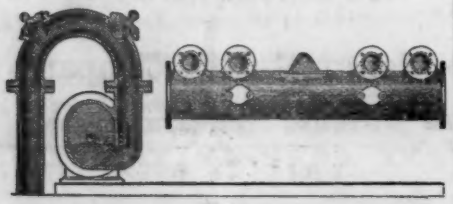

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Extensively used by

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☞ Patent GATES for Water and Steam-stops. ☜

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AT THE GAS WORKS, WASHINGTON, D. C., a 100,000 feet Holder—with centre post 80 feet diameter, 20 feet deep, and in good condition. For further information, address GEO. A. McILHENNY, Engineer Washington Gas Co. 198 4

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ALWAYS READY

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Portable Self-Acting Fire Engine.

No Building Safe Without Them.

Price, $45, $50, $55.

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CLAY RETORT WORKS.

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Also agents for the sale of J.K. BRICK & Co's, Clay Retorts, Fire-Brick, Gas-House tile, etc. 66tf

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Malleable Iron Retort Lid.

SABATTON'S PATENT

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REFERS TO—J. A. Sabattan, Esq., Engineer Manhattan Gas Co—Col. A J. White, Metropolitan Gas Co.—C. C. Mowten, Engineer New-York Gas-light Co.—J. Mowten Saunders, Engineer Baltimore Gas Co.—John T. Harrison, Engineer Savannah Gas Co.

.86] HERRING & FLOYD, Proprietors

SILAS C. HERRING. JAMES R. FLOYD

HEALTH AND ECONOMY.

PATENT LEAD-INCASED TIN PIPE COSTS LESS THAN LEAD PIPE AND IS MUCH STRONGER.

INDORSED BY PHYSICIANS AND WATER COMMISSIONERS EVERYWHERE.

Recent improvements enable us to supply this pipe at a less price per foot than common lead pipe. To furnish the cost we should know the head or pressure of water and bore of pipe.

Pamphlets sent free. Address the

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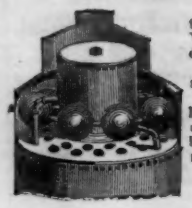

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Fig 3

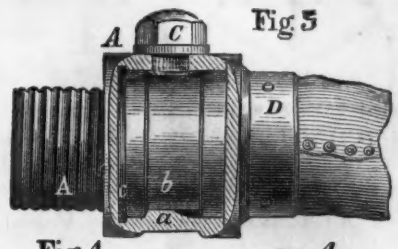

Fig 4

Fig 5

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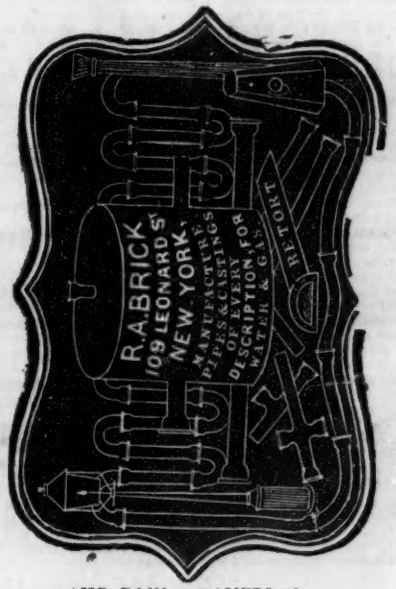

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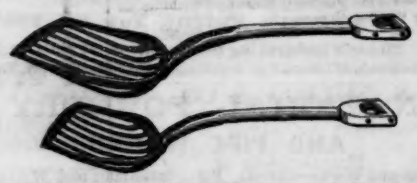

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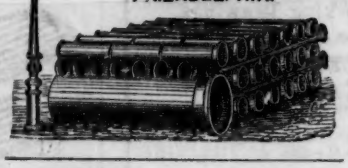

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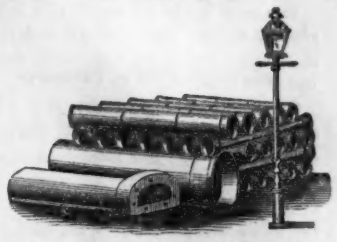

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San Salvador,	..	"	13
San Jacinto,	..	"	20
San Salvador,	..	"	27
San Jacinto	Saturday,	Nov.	3
San Salvador	..	"	10
San Jacinto	..	"	17
San Salvador,	..	"	24

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NEW PATENT

Pianos.

RAVEN & BACON.

(Established 1829.)

Warerooms Nos. 644 & 646 Broadway, N. Y.

Manufacturers of Piano Fortes, with their Patent Combination Sounding-boards,

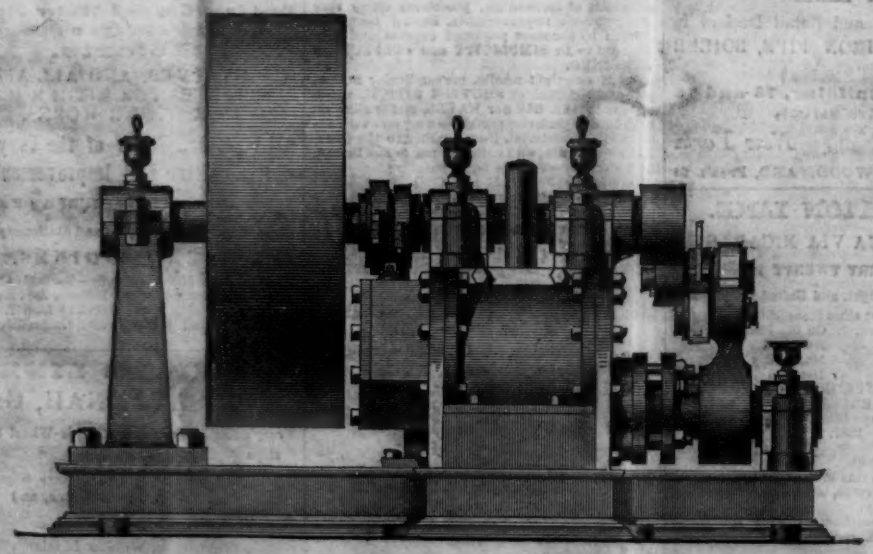
PATENTED AUGUST 14th, 1866.

This invention, introduced exclusively into our Pianos, is of the greatest advantage to the tone of the Instrument, as it affects the sounding-board the very soul of the Piano, and produces thereby a pure liquid tone greatly superior in quality and power to that of the ordinary Piano. The sounding-board released from its connection with the Piano case, and resting upon under sounding-boards, is relieved from the rigidity caused by such connection, and its vibratory quality increased. Our Pianos are first class in every respect, and purchasers will have not only our own guarantee as to their quality, but also the guarantee of the reputation of the instrument, obtained from the experience of our patrons who have used them for a generation. All lovers of this eminently household instrument, as well as parties proposing to purchase new Pianos, are invited to call and examine our assortment.96-1y

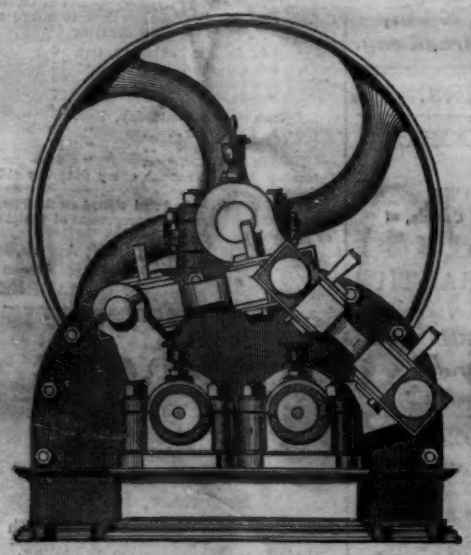
Isbell's Patent Vibrating Piston Engine.

The want has long been felt of a light, compact, simple and durable steam engine, which will occupy but little space, and at the same time have a pleasing symmetry of form.

The accompanying engravings give a clear exhibit of an engine which seems to fulfil these conditions in an eminent degree. The intelligent reader will readily understand its peculiar features by studying the engravings. It is a double engine, has no dead points, and needs no fly-wheel. When one piston is at the end



of the stroke the other is exerting its greatest power with a full head of steam. The friction of moving parts is reduced to a minimum, consequently are durable and require but little attention and repair. It is claimed this engine is lighter, and occupies less room



than any other engine having equal power. The parts are few, and being complete on one bed plate, gives remarkable strength and stability to it.

These engines are said to give entire satisfaction to those having them in operation. More complete and detailed engravings and description will soon appear in this Journal. For terms and other particulars address Smith & Sayre Manufacturing Company, 95 Liberty street, N. Y.

Statistics of Magnesium.

The light emitted by a wire one-thousandth of an inch in diameter, is equal to that of 74 stearine candles of five to the pound; three feet of it are burned per minute, or a quarter of an ounce per hour, the cost of which, at the present price, would be about 2s. 6d. Seventy-four stearine candles would, however, in the same time, consume 2 lbs. of stearine, which would cost 2s.: 40·4 cubic feet of 12 candle coal gas would be required to produce the same effect, and would cost about 2½d. The dearness of magnetism arises from the dearness of sodium required in obtaining it. Sodium is now 10s. per lb., and one pound, under the most favorable circumstances, would be required for a pound of magnesium. But increased demand, no doubt cheapen sodium, and in other ways render the production of magnesium more economical. Already the Magnesium Metal Company have reduced the price of magnesium more than 50 per cent. Magnesium gives off 265 times less heat than gas. Gas and candles vitiate the air by the production of watery vapor and carbonic acid: magnesium is free from this objection, but it has an inconvenience of its own; a large quantity of calcined magnesia is thrown off as a fine powder, which soon renders the atmosphere of a room intolerable. This is also objectionable in photography, though used for very short periods. For ordinary purposes it would render some peculiar mode of ventilation, or purification yet to be discovered, indispensable. Perhaps the smoke might be conducted through water and there condensed. At best magnesium can be only an imperfect substitute for sunlight: its light has been found to be only the 4-525th of that of the sun on a bright November day; but, at the same time, its chemical effect was ascertained to be the 1-36th of that of the sun.—*Exchange.*

Advertising Index.

☞ In looking for advertisements, see figures 1 to 9, within brackets, at head of advertisement pages.

GAS-BURNERS, APPARATUS, ETC.

Arnold's Metallic Gas Trays—T. G. Arnold, 334 and 336 West 21st street, N. Y. 2
American Meter Company, 512 West 22d street, New York 8
Automatic Gas Purifier—State Rights for sale—Wm. C. Turnbull, care of T. C. Babcock, 59 Broadway, or office of the American Gas-Light Journal 2
Builder of Gas Works, Apparatus, Etc.—P. P. Delly, 39 Laurel street, Philadelphia 2
Contractors for Gas-works, Etc.—Murray, Baker & Walker, Fort Wayne, Ind. 2
Cambridge Gas Stoves, Ranges, &c.—Gas Light Journal Offices, 8
Gas Coals—Bird, Perkins & Job, 104 Wall street, New York 2
Gas Engineers and Contractors—Hoy, Kennedy & Co., 111 Liberty street, New York 4
Gas-Burners—C. Gefroror, 509 Commerce street, Philadelphia, Pa. 9
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry street, Philadelphia, Pa. 8
Gas Superintendent—C. M. Cresson, 417 Walnut st., Phil., Pa. 9
Gas Apparatus, &c.—Geo. H. Kitchen & Co., 561 Broadway 9
Gas Burners—Wightman Bros., 25 Kilby st., Boston, Mass. 9
Gas Burners—T. G. Arnold, 334 and 336 West 21st st., N. Y. 9
Gas Burners—W. Anderson, cor Franklin & Elm sts., N. Y. 8
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Gasometers, Etc—George Stacey & Co. Cincinnati, O. 1
Gasoleine.—J. W. Wheeler, 284 Pearl st., New York 4
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Plumbers, Gas and Steam Fitters—Moore & Gausseu, 221 West Fifth street, Cincinnati, O. 6
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Purifying Trays—Jno. L. Cheeseman, 147 and 149 Ave. C, N.Y. 9
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Stanley's Hydraulic Main, Etc.—L. F. Whiting, Boston 1

FOUNDRIES.

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Columbian Iron Works—Wm. Taylor & Sons, 11, 13 and 15 Adams street, Brooklyn, N. Y. 6
Cast Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md. 1
Continental Works—T. F. Rowland, Greenpoint 1
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Gaylord's Great Western Pipe Foundry—Office 90 and 92 Broadway, Cincinnati, Ohio 8
Louisville Pipe Works—Dennis Long, Cor. 9th and Water sts., Louisville, Ky. 9
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Pascal Iron Works—Morris, Tasker & Co., Philadelphia, Pa. 9
Southwark Foundry—Merrick & Sons, Fifth and Washington streets, Philadelphia 9
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Davis' Steam Superheating Boiler—Duplex Steam Boiler M'f'g Company, Long Island City, N. Y. 9
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Steam Pumps—H. R. Worthington, 61 Beekman st. New York 6
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Water and Sewerage Pipes—Am. Water and Gas Pipe Company northwest corner of Green and Bay sts., Jersey City, N. J. 5
Worthington's Water Meters—H. R. Worthington, 61 Beekman street, New York 2
Woodward Steam Pump M'f'g Co. 76, 78 Centre st. New York 9

CLAY RETORT WORKS.

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Brooklyn Clay Retort Works, Van Dyke st. Brooklyn, N. Y. 5
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Empire Sewing Machine Company, 616 Broadway 8
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Finkle & Lyon Sewing Machine Company, 581 Broadway 9
Gas-Light Journal American and Foreign Patent Agency 1
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Works on the Manufacture of Gas—D. Van Nostrand, 192 Broadway, New York 2

THE Mining and Petroleum Standard AND American Gas Light Journal,

is published at No. 22 Pine Street, opposite the Sub-Treasury Building on the 2d and 16th of every month, and is a recognized official organ of—

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PETROLEUM, WATER-SUPPLY, AND

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☞ All communications to be addressed to "The Editors," No 22 Pine Street, New York.